were between the second and fourth magnitudes; twenty were of first magnitude and higher; six of class — 1, and one — 2.

Three fourths were white or yellow, in about the same proportion, and about five each of blue, green, orange, and red.

The duration of half were too swift for estimation, and nearly fifty more were seen for less than one second. Only five were visible for more than one second.

Both duration and length of path were doubtless shortened by moonlight and cloudiness. A course of some 30° and over was traced for about twenty, from 15° to 20° for about thirty, some 10° for about fifty, and a shorter course of 5° or 6° and less for about twenty.

ASTRONOMICAL OBSERVATIONS IN 1900.

MADE BY TORVALD KÖHL, AT ODDER, DENMARK.

VARIABLE STARS.

*Z Cygni.**

March	23:	Z = d.	October	16:	= b.
	30:	id.		21:	id.
April	18:	= e.		23:	id.
	25:	< e.		28:	id.
August	27:	id.	November	12:	= a-
			December	22	= c.

S Ursæ majoris.†

Jannary	25:	S = d.	September	2:	id.
February	20:	< c.		13:	< d. or > e.
March	1:	a little > d.		15:	= d.
	7:	id.		18:	id.
	14:	id.		25:	id.
	23:	= e.		26:	id.
	30:	id.	October	14:	> d. or < c.
April	18:	< e. a little > f.		23:	= d.
	25:	< e.		28.	id.
August	16:	= e.	November	11:	a little < e.
	27:	id.	December	22:	< g.
	29:	id.			

* *Vide* the sketch in the *Publications* A. S. P., No. 48, page 69.

† *Vide* the sketch in the *Publications* A. S. P., No. 73, page 56.

T Ursæ majoris. *

January	25:	T = e.	September	2:	id.
February	20:	> a (= 7.0 Mag.)		13:	id.
March	1:	id.		15:	id.
	7:	id.		18:	id.
	14:	id.		25:	id.
	23:	id.		26:	id.
	30:	= a.	October	14:	< e. / > f.
April	18:	< a. / > b.		23:	= d.
	25:	a little > c.		28:	= c.
August	16:	invisible.	November	11:	> a.
	27:	< g.	December	22:	a little > a.
	29:	id.			

W Pegasi. †

January	25:	W invisible.	October	14:	< g.
February	20:	id.		23:	id.
August	27:	= e.	November	12:	extremely faint,
September	2;	a little < e.	December	22:	invisible.
	13:	< e.			
	18:	id.			
	26:	= f.			

The Star BD. + 46°.2970.

When I observed the new variable BD. +46°.2966 on October 28th, I was surprised to find that the star BD.+46°.2970, which is very faint in the sketch by WILLIAMS (*Astron. Nachr.*, 3629) now was much brighter and = d in the sketch. On October 30th it was even > d, and it showed the same brightness on October 31st, November 10th, 11th, 12th, and December 22d. In *Astron. Nachr.*, 3673, Dr. ERNST HARTWIG has confirmed the remarkable change in brightness. The star is supposed to vary between the ninth and tenth magnitudes in a period not yet known.

SHOOTING STARS.

No.	Time.	Beginning.	End.	Mag.	Note.
	h m s	° °	° °		
1	Aug. 9, 10 16 15 P.M.	291 + 0	280 — 4	♀	Train.
2	17 20	310 + 55	274 + 37	2	
3	21 20	32 + 75	250 + 82	2	
4	55 0	330 + 76	255 + 77	2	
5	11 11 0	348 + 63	318 + 74	3	

* *Vide* the sketch in the *Publications* A. S. P., No. 22, page 63.

† *Vide* the sketch in the *Publtcations* A. S. P., No. 60, page 23.

6	19 50	17 + 17	11 + 14	1	
7	27 10	14 + 41	7 + 35	1	
8	29 15	6 + 26	347 + 17	♀	Yellow train.
9	30 0	11 + 58	359 + 57	3	
10	37 45	19 + 76	46 + 72	1	
11	11 40 20	355 + 46	4 + 38	2	
12	50 25	250 + 75	208 + 71	1	Red.
13	52 10	180 + 67	169 + 65	2	
14	56 50	354 + 52	5 + 44	3	
15	Aug. 11, 10 21 5	228 + 32	216 + 20	2	
16	22 40	8 + 34	17 + 37	♃	
17	27 30	2 + 21	351 + 13	2	
18	11 2 55	312 + 40	288 + 27	♀	Red.
19	14 0	28 + 50	38 + 42	3	
20	21 50	324 + 17	325 + 4	1	
21	28 0	135 + 66	156 + 57	2	
22	31 50	310 + 70	262 + 54	2	
23	37 0	252 + 28	235 + 27	2	
24	47 20	355 + 40	344 + 35	1	
25	57 40	270 + 36	261 + 18	1	
26	Aug. 20, 10 9 0	341 + 26	345 + 33	4	
27	19 10	322 + 62	280 + 39	2	
28	42 0	7 + 46	10 + 37	4	
29	43 40	298 — 7	302 — 16	2	
30	44 50	332 + 3	335 — 2	3	
31	45 0	337 + 10	332 — 1	3	
32	51 30	239 + 17	249 + 9	2	

No. 16. This meteor was also observed at Copenhagen: 184° + 63° (end point).

No. 20. Also observed at Copenhagen: 257° + 21° ⟶ 255° + 10°.

No. 22. End point observed at Copenhagen: 227° + 31°.

The three meteors named have given the following results:—

No.	Beginning.			End.			Real Length of the Path.	Observer.
	h	λ	ϕ	h	λ	ϕ	β	
		° ′	° ′		° ′	° ′		
16	...	...	...	72	0 48	56 18	..	Torvald Köhl. Otto Asmussen.
20	99	1 48	55 18	71	1 47	55 11	32	Torvald Köhl. Otto Asmussen.
22	...	...	...	114	3 15	56 6	..	Torvald Köhl. Otto Asmussen.

*** h and β are expressed in kilometers; λ is W. long. from Copenhagen; ϕ is N. lat.; h is the altitude of the meteor above the Earth's surface.

Odder is situated in 2° 25′ W. long. from Copenhagen and 55° 58′ N. lat.

FIREBALLS.

In the past year fifteen fireballs have been seen from stations in Denmark.

No.	Time.				Beginning.	End.	Mag.	Station.	Note.
			h	m					
1	Jan.	1,	1	1 A.M.	140° + 35°	115° + 2°	♀	Odder.....	Train, lasting 5 seconds.
2		15,	5	27 P.M.	.....	NNE. 45° alt.	*	Stubbeköping...	Explosion.
3	Feb.	8,	9	30	.....	NNE. 45° alt.	*	Otterup.....	Explosion.
4	May	3,	10	20	.....	NW. 70° alt.	*	Himmelbjerg ...	Train, lasting for several seconds, illuminating the country.
5	June	14,	9	12	352° + 46°	331° + 32°	¼☾	Holbek.....	Explosion; blue; duration 2 to 3 seconds. Seen from several stations.
6		21,	10	30	Zenith.	NNW.	♀	Odder.....	Explosion.
7	Aug.	15,	8	40	.....	246° — 17°	*	Holbek.....	Train, for 4 seconds. Same meteor was seen in Sonderburg, illuminating the town, and burst into 20 to 30 pieces.
8	Sept.	14,	11	15	.....	NE. 12° alt.	*	Hellerup.....	White.
9	Oct.	1,	8	59	.....	ESE. 30° alt.	¾☾	Kolding.....	Red.
10		20,	7	45	SW.	NE.	*	Lemvig.....	Red-yellow train.
11			10	30	.....	W.	*	Birkerød.....	Train.
12	Nov.	5,	5	51	165° + 55°	209° + 26°	♀	Præstö	Very slow; durat'n 10 s.
13		9,	12	22 A.M.	78 — 11	82° — 16°	♀	Præstö	Train.
14	Dec.	16,	4	40 P.M.	.....	S.W. 8° alt.	☾	Copenhagen....	Beautiful train, lasting a quarter to half an hour.
15			9	13	E.	S.	*	Snekkersten....	Explosion.

LARGE FIREBALL.

Among the meteors of this year No. 14 was of special interest. About this fireball, observed by thousands of men in Denmark, Northern Germany, and Holland, I received seventy-three letters from as many observers in the countries named. In the southern part of Sjælland the opinion of a large *comet* arose, because the train of the meteor lasted so long. Two observers at Copen-

hagen thought the phenomenon was only at a few miles distance, but as from *all* stations in Denmark it was standing near the horizon in the southwest, where the Sun lately had been setting, it was evident that the fireball must have passed over Northwestern Germany. This opinion was soon confirmed. From Hamburg and Bremen the phenomenon was seen rather in a *westerly* direction, from Wilhelmshafen to the *south*, from Amsterdam to the southeast, and from Cöln to the *north*.

The fireball lighted up the whole country, and thousands of spectators were frightened and looked astonished at the sparkling object that, like another moon, was traveling across the sky. In fact it is told that some children in a German village rushed into the house, crying: "Papa! Mama! Come out directly! The moon fell down from the sky just now, and is sticking in Minnermann's tree!"

The meteor whirled about on the last part of its path, then suddenly it burst into pieces with a rain of sparks, flashed up in a bluish light, dashed downward, and disappeared. Afterwards a large train was seen, at first forming a straight line, then a broken one like a lightning-flash. After that the figure of an S was seen and after twelve to fifteen (from Hamburg is said thirty) minutes the faint remainders of the train finally disappeared. It is not yet certain *where* the fireball fell to the ground, if it fell at all. Perhaps it took place in the southern part of Oldenburg.

In the past year a little transit-instrument (GUSTAV HEYDE, in Dresden) has been erected in the garden, and a wedge-photometer (JOEPFER, in Potsdam) for observations of variable stars has been attached to the 3-inch Steinheil refractor. Since 1900, April 1st, the private observatory at Odder has received a yearly grant from the Danish Government.

PLANETARY PHENOMENA FOR MARCH AND APRIL, 1901.

By MALCOLM MCNEILL.

MARCH.

The Sun is at the vernal equinox, and spring begins, March 20th, 11 P. M., P. S. T.

Mercury is an evening star at the beginning of the month,